

## SEQUENCE LISTING

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<151> 1998-12-31

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<211> 893

<212> DNA

$\langle 220 \rangle$

<221> CDS

<222> (1)..(861)

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Ala Thr Asn Ser Ile Ile Ala Asp Met Thr Lys Ala Ile Ala Gly Asp

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30

Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln Asp Pro His Glu

45

-2-

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Tyr Glu Pro Leu Pro Glu Asp Ala Glu Lys Thr Ser Asn Ala Asp Val  
50 55 60  
att ttc tat aat ggt atc aat cta gaa gat ggc ggg caa gct tgg ttc 240  
5 Ile Phe Tyr Asn Gly Ile Asn Leu Glu Asp Gly Gly Gln Ala Trp Phe  
65 70 75 80  
acc aaa cta gtg aaa aat gct caa aaa acg aaa aac aaa gat tac ttt 288  
Thr Lys Leu Val Lys Asn Ala Gln Lys Thr Lys Asn Lys Asp Tyr Phe  
85 90 95  
10 gcc gtg tct gat ggc att gat gtg att tac ttg gaa ggt gca agc gaa 336  
Ala Val Ser Asp Gly Ile Asp Val Ile Tyr Leu Glu Gly Ala Ser Glu  
100 105 110  
aaa gga aaa gaa gat cca cat gct tgg tta aat ctc gaa aac gga atc 384  
Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu Glu Asn Gly Ile  
15 115 120 125  
att tat tca aaa aac att gcc aaa caa ttg att gca aag gat cct aaa 432  
Ile Tyr Ser Lys Asn Ile Ala Lys Gln Leu Ile Ala Lys Asp Pro Lys  
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aac aaa gaa act tat gaa aag aac cta aaa gct tat gtg gct aaa ttg 480  
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145 150 155 160  
gaa aaa cta gac aaa gaa gcc aaa tca aaa ttt gat gct att gca gaa 528  
Glu Lys Leu Asp Lys Glu Ala Lys Ser Lys Phe Asp Ala Ile Ala Glu  
165 170 175  
25 aat aaa aaa ttg att gtg act agt gaa ggc tgc ttc aag tac ttt tca 576  
Asn Lys Lys Leu Ile Val Thr Ser Glu Gly Cys Phe Lys Tyr Phe Ser  
180 185 190  
aaa gct tac ggt gtc cca tct gct tat atc tgg gaa att aac acc gaa 624  
Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu Ile Asn Thr Glu  
30 195 200 205  
gaa gaa gga aca cca gat caa att tca tca ttg att gaa aaa cta aaa 672

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Glu Glu Gly Thr Pro Asp Gln Ile Ser Ser Leu Ile Glu Lys Leu Lys  
210 215 220  
gtc atc aag cca tct gcg ctt ttt gta gag tca agt gtc gat aga cgc 720  
Val Ile Lys Pro Ser Ala Leu Phe Val Glu Ser Ser Val Asp Arg Arg  
5 225 230 235 240  
cct atg gaa act gtt tct aaa gat agt ggt att cct att tat tct gag 768  
Pro Met Glu Thr Val Ser Lys Asp Ser Gly Ile Pro Ile Tyr Ser Glu  
245 250 255  
atc ttt aca gat tca att gct aaa aaa ggt aaa cct ggc gat agt tat 816  
10 Ile Phe Thr Asp Ser Ile Ala Lys Lys Gly Lys Pro Gly Asp Ser Tyr  
260 265 270  
tat gct atg atg aaa tgg aac ctt gac aaa att tct gaa ggt cta 861  
Tyr Ala Met Met Lys Trp Asn Leu Asp Lys Ile Ser Glu Gly Leu  
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Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln Asp Pro His Glu  
35 40 45  
30 Tyr Glu Pro Leu Pro Glu Asp Ala Glu Lys Thr Ser Asn Ala Asp Val  
50 55 60

-4-

Ile Phe Tyr Asn Gly Ile Asn Leu Glu Asp Gly Gly Gln Ala Trp Phe  
65 70 75 80  
Thr Lys Leu Val Lys Asn Ala Gln Lys Thr Lys Asn Lys Asp Tyr Phe  
85 90 95  
5 Ala Val Ser Asp Gly Ile Asp Val Ile Tyr Leu Glu Gly Ala Ser Glu  
100 105 110  
Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu Glu Asn Gly Ile  
115 120 125  
Ile Tyr Ser Lys Asn Ile Ala Lys Gln Leu Ile Ala Lys Asp Pro Lys  
10 130 135 140  
Asn Lys Glu Thr Tyr Glu Lys Asn Leu Lys Ala Tyr Val Ala Lys Leu  
145 150 155 160  
Glu Lys Leu Asp Lys Glu Ala Lys Ser Lys Phe Asp Ala Ile Ala Glu  
165 170 175  
15 Asn Lys Lys Leu Ile Val Thr Ser Glu Gly Cys Phe Lys Tyr Phe Ser  
180 185 190  
Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu Ile Asn Thr Glu  
195 200 205  
Glu Glu Gly Thr Pro Asp Gln Ile Ser Ser Leu Ile Glu Lys Leu Lys  
20 210 215 220  
Val Ile Lys Pro Ser Ala Leu Phe Val Glu Ser Ser Val Asp Arg Arg  
225 230 235 240  
Pro Met Glu Thr Val Ser Lys Asp Ser Gly Ile Pro Ile Tyr Ser Glu  
245 250 255  
25 Ile Phe Thr Asp Ser Ile Ala Lys Lys Gly Lys Pro Gly Asp Ser Tyr  
260 265 270  
Tyr Ala Met Met Lys Trp Asn Leu Asp Lys Ile Ser Glu Gly Leu  
275 280 285  
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&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

5 &lt;223&gt; Description of Artificial Sequence: PCR primer

&lt;400&gt; 3

tagtagcgaa ttcgtcgact ggcgcta

27

10 &lt;210&gt; 4

&lt;211&gt; 28

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

15 &lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: PCR primer

&lt;400&gt; 4

agcacaactc gagaatcgct gtgcttta

28

20

&lt;210&gt; 5

&lt;211&gt; 17

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pyogenes

25

&lt;400&gt; 5

Lys Gln Leu Ile Ala Lys Asp Pro Lys Asn Lys Glu Thr Tyr Glu Lys

1

5

10

15

Asn

30

&lt;210&gt; 6

-6-

&lt;211&gt; 19

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pyogenes

5 &lt;400&gt; 6

Glu Ile Asn Thr Glu Glu Glu Gly Thr Pro Asp Gln Ile Ser Ser Leu

1

5

10

15

Ile Glu Lys

10 &lt;210&gt; 7

&lt;211&gt; 16

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pyogenes

15 &lt;400&gt; 7

Glu Ser Ser Val Asp Arg Arg Pro Met Glu Thr Val Ser Lys Asp Ser

1

5

10

15

&lt;210&gt; 8

20 &lt;211&gt; 21

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pyogenes

&lt;400&gt; 8

25 Thr Asp Ser Ile Ala Lys Lys Gly Lys Pro Gly Asp Ser Tyr Tyr Ala

1

5

10

15

Met Met Lys Trp Asn

20

30 &lt;210&gt; 9

&lt;211&gt; 13

-7-

<212> PRT

<213> Streptococcus pyogenes

<400> 9

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SEQUENCE LISTING

<110> BJORCK, Lars

JANULCZYK, Robert

<120> STREPTOCOCCAL ABC TRANSPORTER PROTEIN

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<140>

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<150> PCT/GB99/04445

<151> 1999-12-30

<150> GB 9828880.6

<151> 1998-12-31

<160> 9

<170> PatentIn Ver. 2.1

<210> 1

<211> 893

<212> DNA

<213> Streptococcus pyogenes

<220>

<221> CDS

<222> (1)..(861)

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Ser Ser Thr Gly Ala Lys Thr Ala Lys Ser Asp Lys Leu Lys Val Val

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gca acc aat tca att att gcc gac atg aca aaa gct att gct ggt gat 96

Ala Thr Asn Ser Ile Ile Ala Asp Met Thr Lys Ala Ile Ala Gly Asp

20 25 30



aaa atc gat ctg cac agc att gtg cca atc ggt caa gac cct cat gag 144

Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln Asp Pro His Glu

35 40 45

tac gaa cca tta cca gaa gat gct gaa aaa aca agt aat gct gat gtg 192

Tyr Glu Pro Leu Pro Glu Asp Ala Glu Lys Thr Ser Asn Ala Asp Val

50 55 60

att ttc tat aat ggt atc aat cta gaa gat ggc ggg caa gct tgg ttc 240

Ile Phe Tyr Asn Gly Ile Asn Leu Glu Asp Gly Gly Gln Ala Trp Phe

65 70 75 80

acc aaa cta gtg aaa aat gct caa aaa acg aaa aac aaa gat tac ttt 288

Thr Lys Leu Val Lys Asn Ala Gln Lys Thr Lys Asn Lys Asp Tyr Phe

85 90 95

gcc gtg tct gat ggc att gat gtg att tac ttg gaa ggt gca agc gaa 336

Ala Val Ser Asp Gly Ile Asp Val Ile Tyr Leu Glu Gly Ala Ser Glu

100 105 110

aaa gga aaa gaa gat cca cat gct tgg tta aat ctc gaa aac gga atc 384

Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu Glu Asn Gly Ile

115 120 125

att tat tca aaa aac att gcc aaa caa ttg att gca aag gat cct aaa 432

Ile Tyr Ser Lys Asn Ile Ala Lys Gln Leu Ile Ala Lys Asp Pro Lys

130 135 140

aac aaa gaa act tat gaa aag aac cta aaa gct tat gtg gct aaa ttg 480

Asn Lys Glu Thr Tyr Glu Lys Asn Leu Lys Ala Tyr Val Ala Lys Leu

145 150 155 160

gaa aaa cta gac aaa gaa gcc aaa tca aaa ttt gat gct att gca gaa 528

Glu Lys Leu Asp Lys Glu Ala Lys Ser Lys Phe Asp Ala Ile Ala Glu

165 170 175

aat aaa aaa ttg att gtg act agt gaa ggc tgc ttc aag tac ttt tca 576

Asn Lys Lys Leu Ile Val Thr Ser Glu Gly Cys Phe Lys Tyr Phe Ser

180 185 190

aaa gct tac ggt gtc cca tct gct tat atc tgg gaa att aac acc gaa 624

Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu Ile Asn Thr Glu

195 200 205

gaa gaa gga aca cca gat caa att tca tca ttg att gaa aaa cta aaa 672

Glu Glu Gly Thr Pro Asp Gln Ile Ser Ser Leu Ile Glu Lys Leu Lys

210 215 220

gtc atc aag cca tct gcg ctt ttt gta gag tca agt gtc gat aga cgc 720

Val Ile Lys Pro Ser Ala Leu Phe Val Glu Ser Ser Val Asp Arg Arg

225            230            235            240  
 cct atg gaa act gtt tct aaa gat agt ggt att cct att tat tct gag 768  
 Pro Met Glu Thr Val Ser Lys Asp Ser Gly Ile Pro Ile Tyr Ser Glu  
           245            250            255  
 atc ttt aca gat tca att gct aaa aaa ggt aaa cct ggc gat agt tat 816  
 Ile Phe Thr Asp Ser Ile Ala Lys Lys Gly Lys Pro Gly Asp Ser Tyr  
           260            265            270  
 tat gct atg atg aaa tgg aac ctt gac aaa att tct gaa ggt cta 861  
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<210> 2  
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           20            25            30  
 Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln Asp Pro His Glu  
           35            40            45  
  
 Tyr Glu Pro Leu Pro Glu Asp Ala Glu Lys Thr Ser Asn Ala Asp Val  
   50            55            60  
 Ile Phe Tyr Asn Gly Ile Asn Leu Glu Asp Gly Gly Gln Ala Trp Phe  
   65            70            75            80  
 Thr Lys Leu Val Lys Asn Ala Gln Lys Thr Lys Asn Lys Asp Tyr Phe  
           85            90            95  
 Ala Val Ser Asp Gly Ile Asp Val Ile Tyr Leu Glu Gly Ala Ser Glu  
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 Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu Glu Asn Gly Ile  
           115            120            125  
 Ile Tyr Ser Lys Asn Ile Ala Lys Gln Leu Ile Ala Lys Asp Pro Lys  
           130            135            140  
 Asn Lys Glu Thr Tyr Glu Lys Asn Leu Lys Ala Tyr Val Ala Lys Leu

145            150            155            160  
 Glu Lys Leu Asp Lys Glu Ala Lys Ser Lys Phe Asp Ala Ile Ala Glu  
           165            170            175  
 Asn Lys Lys Leu Ile Val Thr Ser Glu Gly Cys Phe Lys Tyr Phe Ser  
           180            185            190  
 Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu Ile Asn Thr Glu  
           195            200            205  
 Glu Glu Gly Thr Pro Asp Gln Ile Ser Ser Leu Ile Glu Lys Leu Lys  
           210            215            220  
 Val Ile Lys Pro Ser Ala Leu Phe Val Glu Ser Ser Val Asp Arg Arg  
 225            230            235            240  
 Pro Met Glu Thr Val Ser Lys Asp Ser Gly Ile Pro Ile Tyr Ser Glu  
           245            250            255  
 Ile Phe Thr Asp Ser Ile Ala Lys Lys Gly Lys Pro Gly Asp Ser Tyr  
           260            265            270  
 Tyr Ala Met Met Lys Trp Asn Leu Asp Lys Ile Ser Glu Gly Leu  
           275            280            285

<210> 3

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 3

tagtagcgaa ttcgtcgact ggcgcta

27

<210> 4

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 4

agcacaactc gagaatcgct gtgcttta

28

<210> 5

<211> 17

<212> PRT

<213> Streptococcus pyogenes

<400> 5

Lys Gln Leu Ile Ala Lys Asp Pro Lys Asn Lys Glu Thr Tyr Glu Lys

1 5 10 15

Asn

<210> 6

<211> 19

<212> PRT

<213> Streptococcus pyogenes

<400> 6

Glu Ile Asn Thr Glu Glu Glu Gly Thr Pro Asp Gln Ile Ser Ser Leu

1 5 10 15

Ile Glu Lys

<210> 7

<211> 16

<212> PRT

<213> Streptococcus pyogenes

<400> 7

Glu Ser Ser Val Asp Arg Arg Pro Met Glu Thr Val Ser Lys Asp Ser

1 5 10 15

<210> 8

<211> 21

<212> PRT

<213> Streptococcus pyogenes

<400> 8

Thr Asp Ser Ile Ala Lys Lys Gly Lys Pro Gly Asp Ser Tyr Tyr Ala

1 5 10 15  
Met Met Lys Trp Asn  
20

<210> 9

<211> 13

<212> PRT

<213> Streptococcus pyogenes

<400> 9

Gln Asp Pro His Glu Tyr Glu Pro Leu Pro Glu Asp Val

1 5 10